Hybrid telerehabilitation in patients with hypertrophic cardiomyopathy without left ventricular outflow tract obstruction and preserved left ventricular ejection fraction-the randomised clinical trial

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Background: Hypertrophic cardiomyopathy (HCM) is the most common hereditary heart disease, and its diagnosis is often associated with limited physical activity. Little is known about cardiac rehabilitation programs for patients with HCM. Therefore the novel hybrid cardiac telerehabilitation (HCTR) model consisting of hospital-based rehabilitation and home-based telemonitored rehabilitation might be an option to improve physical capacity in patients with HCM.

Purpose: To evaluate the safety, effectiveness and adherence to HCTR in patients with HCM without the left ventricle (LV) outflow tract obstruction and preserved LV ejection fraction.

Methods: The study group comprised 60 patients with HCM (51.1±13.3 years; NYHA II-III; LV ejection fraction 66.1±6.9%). Patients were randomised (1:1) to either HCTR program (hospital-based rehabilitation [1 month] based on cycloergometer training and home-based telemonitored rehabilitation [2 months] based on Nordic walking, five times a week, at 40–70% of maximal estimated heart rate) - training group (TG), or to a control group (CG). All patients had implantable cardioverter-defibrillator. In order to perform home-based telemonitored rehabilitation, a special device was used which enabled patients to: (1) do Nordic walking training according to a preprogrammed plan, (2) record and send electrocardiograms (ECGs) via mobile phone network to the monitoring centre. The moments of automatic ECGs registration were pre-set and coordinated with exercise training. The effectiveness of HCTR was assessed by changes - delta (∆) in duration (t) of the workload, peak oxygen consumption (pVO2) in cardiopulmonary exercise test, 6-minute walking test distance (6-MWT) as a result of comparing t (s), pVO2 (ml/kg/min), 6-MWT (m) from the beginning and the end of the program.

Results: Safety of HCTR. Neither death nor other serious adverse events occurred during HCTR. We did not observe any ICDs intervention during the HCTR.

Effectiveness of HCTR: Within-group analysis: t, pVO2, 6-MWT increased significantly in TG: t 657±183 vs 766±181 ($p<0.001$), pVO2 19.2±5.0 vs 20.6±4.9 ($p=0.007$), 6-MWT 445±88 vs 551±77 ($p<0.001$). In the untrained CG, the unfavourable results were observed: 695±198 vs 717±187 ($p=0.114$), pVO2 21.2±5.1 vs 21.1±5.6 ($p=0.723$), 6-MWT 512±83 vs 536±84 ($p=0.061$).

Between-group analysis: The differences between TG and CG were statistically significant: in Δt ($p<0.001$); ΔpVO2 ($p=0.012$); Δ6-MWT ($p<0.001$).

Adherence to HCTR: In TG 28 patients (93%) completed the HCTR program. Two patients did no undergo HCTR because of personal issues.

Conclusion: Hybrid cardiac telerehabilitation in patients with HCM without the left ventricle (LV) outflow tract obstruction and preserved LV ejection fraction is safe and effective. The adherence to HCTR is high.